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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,329	03/15/2004	Nadim Y. Abdo	MS1-1785US	1950

22801 7590 11/24/2009
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EXAMINER	
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ART UNIT	PAPER NUMBER
2444	

NOTIFICATION DATE	DELIVERY MODE
11/24/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)
	10/801,329	ABDO ET AL.
	Examiner	**Art Unit**
	CARLOS R. PEREZ TORO	2444

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/15/2009 has been entered.

Response to Arguments

2. Applicant's arguments filed 9/15/2009 have been fully considered but they are not persuasive.

3. Applicant argues that Whiting-Vidal fails to teach or suggest "further compressing the compressed data by encoding the at least one representation." *Remarks*, pg 29, line 5.

4. It is evident from the detailed mappings found in the below rejection(s) that Whiting-Vidal teaches this functionality. Whiting teaches using maintaining a history buffer of data and encoding subsequent data by mapping it to locations in the history buffer. Whiting col 9/ln 31-44. Vidal teaches a compression program that takes a block of data having a predetermined size and tries to compress the block using various compression algorithms. Vidal at 0042. Vidal teaches using Huffman encoding as one of the compression algorithms. Vidal at 0042. Vidal further teaches using various combinations of algorithms to compress the data. Vidal at 0042. One of ordinary skill in the art would readily understand that by a "combination of algorithms" Vidal means applying one compression algorithm to a data, and subsequently applying a different compression algorithm to the result of the first algorithm. It would be readily apparent to one of ordinary skill in the art that Vidal's teachings can be straightforwardly applied to the result of Whiting's algorithm to further compress the data. In fact, Vidal explicitly teaches using the same Huffman encoding algorithm. Thus, Applicant's arguments

drawn toward distinction of the claimed invention and the prior art teachings on this point are not considered persuasive.

5. Applicant argues that Whiting-Vidal fails to teach or suggest “wherein the at least one representation is encoded using a first Huffman table for encoding the length using Huffman encoding and using a last recently used (LRU) table for encoding the location of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences, wherein, when the location of the matching sequence is not in the LRU table, the location of the matching sequence is encoded with Huffman encoding using a second Huffman table, different from the first Huffman table”. Specifically, Applicant argues Whiting-Vidal fails to teach “when the location of the matching sequence is not in the LRU table, the location of the matching sequence is encoded with Huffman encoding using a second Huffman table, different from the first Huffman table.” *Remarks,* pg 30, par 2.

6. It is evident from the detailed mappings found in the below rejection(s) that Whiting-Vidal teaches this functionality. Whiting teaches using maintaining a history buffer of data and encoding subsequent data by mapping it to locations in the history buffer. Whiting col 9/ln 31-44. Whiting further teaches using an internal match buffer, analogous to a look aside buffer, to efficiently enhance processing by searching for the contents of the current string. Whiting col 15/ln 11-24. Vidal teaches a compression program that takes a block of data having a predetermined size and tries to compress the block using various compression algorithms. Vidal at 0042. Vidal teaches using Huffman encoding as one of the compression algorithms. Vidal at 0042. Vidal further teaches using various combinations of algorithms to compress the data. Vidal at 0042. Vidal teaches that the program selects the algorithm that yields the highest compression ratio. Vidal at 0042. One of ordinary skill in the art would readily understand that by a “combination of algorithms” Vidal means applying one compression algorithm to a data, and subsequently applying a different compression algorithm to the result of the first algorithm. It would be readily apparent to one of ordinary skill in the art that Vidal’s

teachings can be straightforwardly applied to the result of Whiting's algorithm, including the results after a miss in the look aside buffer, to further compress the data. Thus, Applicant's arguments drawn toward distinction of the claimed invention and the prior art teachings on this point are not considered persuasive.

7. Applicant argues that Whiting-Tokunaga-Vidal fails to teach or suggest "tuning one or more parameters of the compression process utilized to compress the packetized compressed data in response to the feedback, wherein the tuning comprises increasing a size of a search window used for sequence matching in the compression process when the feedback indicates that the compressed data is being transmitted over the network at a lower than expected rate." *Remarks,* pg 34, par 1.

8. It is evident from the detailed mappings found in the below rejection(s) that Whiting-Vidal teaches this functionality. Whiting teaches using maintaining a history buffer of data and encoding subsequent data by mapping it to locations in the history buffer. Whiting col 9/ln 31-44. Whiting teaches his algorithm uses a MAXSTR variable, which describes the size of a search window used for sequence matching in the compression process. Whiting col 11/ln 6-7. Tokunaga teaches a compression algorithm including a traffic detecting unit which adjusts a compression parameter depending on the quantity of traffic in a network. Tokunaga col 3/ln 23-40. It would be readily apparent to one of ordinary skill in the art that Tokunaga's teachings can be straightforwardly applied to the MAXSTR compression parameter of Whiting's algorithm. One of ordinary skill in the art would be motivated to do so in order to adjust compression depending on available network bandwidth. *See* Tokunaga col 2/ln 39-45. Thus, Applicant's arguments drawn toward distinction of the claimed invention and the prior art teachings on this point are not considered persuasive.

9. Applicant argues that Whiting-Tokunaga-Vidal fails to teach or suggest "periodically recalculate the first Huffman table and the second Huffman table following

processing of a predetermined number of packets of the data." *Remarks*, pg 38, par 2. This argument is moot in view of the new grounds of rejection as detailed below.

10. Applicant argues that Whiting-Tokunaga-Vidal fails to teach or suggest "when an encoded representation is present in the configured data, the decompression module is configured decode the representation using the LRU table, the third and fourth Huffman tables and finds the matching sequence in the second said history buffer based on the decoded location and the decoded length indicated by the representation."

11. Whiting teaches using maintaining a history buffer of data and encoding subsequent data by mapping it to locations in the history buffer. Whiting col 9/ln 31-44. Whiting further teaches a unit receiving a compressed string and decompressing such data by finding it in the history buffer using locating and length indicated by the received string. Whiting col 10/ln 57-60. Vidal teaches a compression program that takes a block of data having a predetermined size and tries to compress the block using various compression algorithms. Vidal at 0042. Vidal teaches using Huffman encoding as one of the compression algorithms. Vidal at 0042. Vidal further teaches using various combinations of algorithms to compress the data. Vidal at 0042. One of ordinary skill in the art would readily understand that by a "combination of algorithms" Vidal means applying one compression algorithm to a data, and subsequently applying a different compression algorithm to the result of the first algorithm. It would be readily apparent to one of ordinary skill in the art that Vidal's teachings can be straightforwardly applied to the result of Whiting's algorithm to further compress the data. It would also be readily apparent to one of ordinary skill in the art that decompression of compressed data would require using corresponding Huffman and look aside buffer tables. Thus, Applicant's arguments drawn toward distinction of the claimed invention and the prior art teachings on this point are not considered persuasive.

12. For the above stated reasons, the rejection is maintained.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 1-16 and 23-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whiting et al. (US 5,146,221) (hereinafter Whiting) in view of Vidal et al. (US 2002/0078241) (hereinafter Vidal).

15. Regarding claim 1, Whiting teaches a method of streaming data over a network from a first device to a second device, the method comprising:

compressing the data at the first device by finding an index in a lookup (hash) table that matches an initial sequence in the data (Whiting col 9/ln 42-44; col 10/ln 57-58), wherein:

the lookup table includes a plurality of (bin) entries, each said entry being discoverable utilizing a particular one of a plurality of said (hash value) indices (Whiting col 10/ln 58-60); and

each said entry references whether a corresponding said index is located in a history buffer, and if so, further references (in a hash link table)one or more locations (array pointers) of the corresponding said index in the history buffer (Whiting col 10/ln 58-67); and

if the corresponding said entry of the matching index references a plurality of said locations (Whiting col 9/ln 59):

for each said location, comparing a sequence at the location having the matching index with a sequence in the data, said sequence including the initial sequence (Whiting col 9/ln 49-65);

deriving a matching sequence from the comparison based on at least one of a length and the location of the sequence at each said location (Whiting col 5/ln 61-62);

representing the matching sequence using a representation that includes the length and the location of the matching sequence in the history buffer (Whiting col 5/ln 66-68); and

forming compressed data that includes at least one of said representations (Whiting col 5/ln 61-62).

Whiting does not explicitly teach further compressing the compressed data.

However in the same field of invention, Vidal teaches using a combination of compression algorithms including:

further compressing the compressed data by encoding the at least one representation, wherein the at least one representation is encoded using a first Huffman table for encoding the length using Huffman (Vidal 0041) encoding and usinq a last recently used (LRU) table for encoding the location of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences (Whiting col 15/ln 11-24), wherein, when the location of the matching sequence is not in the LRU table (cache miss), the location of the matching sequence is encoded with Huffman encoding using a second Huffman table, different from the first Huffman table (Vidal 0042) (through the idea of trying a combination of algorithms); and

streaming the compressed data over the network to the second device (Vidal 0002).

At the time the invention was made, given the teachings for compressing data by matching sequence of data to be compressed with a sequence of data in a history buffer, the teachings of Vidal for using a combination of compression algorithms would have been obvious. One of ordinary skill in the art would be motivated to compress

data multiple times with various algorithms in order to achieve a higher compression ratio (Vidal 0042).

16. Regarding claim 2, Whiting-Vidal teaches:

the forming compressed data includes finding one said index in the lookup table for each said sequence in the data (Whiting col 10/ln 58-67).

17. Regarding claim 3, Whiting-Vidal teaches the corresponding said entry of the matching index references a hash chain (hash link table) which includes each said location of the matching index in the history buffer (Whiting col 10/ln 58-67).

18. Regarding claim 4, Whiting-Vidal teaches the initial sequence and the index are each composed of at least two bytes (Whiting col 9/ln 58-61).

19. Regarding claim 5, Whiting-Vidal teaches:

streaming the compressed data over a network, wherein the data is formatted as one or more packets and the packets are compressed for transmission over the network so that the compressing is performed on a per-packet basis (Vidal 0047).

20. Regarding claim 6, Whiting-Vidal teaches:

using the second Huffman table to also compress literal sequences that have no matching index in the history buffer (Vidal 0047); and

streaming the compressed literal sequences to the second device (Vidal 0002).

21. Regarding claim 7, Whiting-Vidal teaches:

determining that the corresponding said entry of the matching index references a single said location:

comparing a sequence at the single said location having the matching index with the sequence in the data (Whiting col 9/ln 49-65);

deriving a matching sequence from the comparison based on at least one of a length and the location of the sequence at the single said location (Whiting col 5/ln 61-62); and

representing the matching sequence using a representation that includes the length and the single said location of the matching sequence in the history buffer (Whiting col 5/ln 66-68); and

when each said sequence of the data is represented or encoded, streaming the data having the encoding or the representation (Whiting col 2/ln 1-11).

22. Regarding claim 8, Whiting-Vidal teaches the comparison to derive the matching sequence is performed utilizing one or more thresholds selected from the group consisting of:

a number of said locations having the matching index to be compared (MAXHCNT) (Whiting col 14/ln 19-21);

a size of a value that describes each said location having the matching index (MEMSIZE) (Whiting col 10/ln 21-24); and

a size of a value that describes a length of the sequence at each said location that matches the sequence in the data that includes the matching index (MAXSTR) (Whiting col 11/ln 6-7).

23. Regarding claim 9, Whiting-Vidal teaches employing a cost function (compare size) to determine if the representation utilizes less memory when stored than the matching sequence, and if so, forming compressed data that includes the representation (Whiting col 5/ln 28-34).

24. Regarding claim 10, Whiting-Vidal teaches determining whether the location of the matching sequence matches one of a plurality of locations in the LRU table (look aside buffer) (Whiting col 15/ln 17-25), wherein:

each said location in the LRU table has a corresponding said LRU representation (Whiting col 15/ln 17-25);

each said location in the LRU table describes one of a plurality of last recently used locations of sequences in previously streamed data (Whiting col 15/ln 17-25); and

if the location of the matching sequence is included in the LRU table, the location of the matching sequence is encoded with a corresponding said LRU representation from the LRU table (Whiting col 15/ln 17-25).

25. Regarding claim 11, Whiting-Vidal teaches one or more computer-readable storage media storing computer-executable instructions that, when executed, perform the method as recited in claim 1 (Whiting Fig 1).

26. Regarding claim 12, Whiting-Vidal teaches a method comprising compressing data for communication in a terminal services environment by:

adding data to a history buffer (history array) (Whiting col 10/ln 56-67);

updating a lookup table that references the history buffer to include the added data, (Whiting col 10/ln 56-67);wherein:

the lookup table includes a plurality of entries, each said entry being discoverable utilizing a particular one of a plurality of indices (Whiting col 10/ln 56-67); and

each said entry references whether a corresponding said index is located in a history buffer, and if so, further references one or more locations of the corresponding said index in the history buffer (Whiting col 10/ln 56-67);

starting a current pointer at the added data in the history buffer (Whiting col 6/ln 62-64);

finding one said index in the lookup table that matches an initial sequence at the current pointer (Whiting col 9/ln 42-44; col 10/ln 57-58);

determining that the corresponding said entry of the matching index references a plurality of said locations (Whiting col 9/ln 49-65):

comparing a sequence at each said location having the matching index with a sequence in the added input data that includes the initial sequence(Whiting col 9/ln 49-65);

deriving a matching sequence from the comparison (Whiting col 5/ln 61-68);

representing the matching sequence with a representation that includes the location and a length of the matching sequence in the history buffer (Whiting col 5/ln 61-68);

employing a cost function to determine if the representation utilizes less memory space when stored than the matching sequence (Whiting col 5/ln 28-34),

packetizing the configured data for streaming (Whiting col 2/ln 1-11).

27. Whiting does not explicitly teach further compressing the compressed data.

28. However in the same field of invention, Vidal teaches using a combination of compression algorithms including:

if the representation utilizes less memory, configuring data to include the representation and advancing the current pointer by the length of the matching sequence (Whiting col 5/ln 28-34; col 6/ln 62-64), and encoding at least a potion of the representation to further compress the data by encoding the representation, wherein the representation is encoded using a first Huffman table for encoding the length using Huffman encoding and using a last recently used (LRU) table for encoding the location. of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences, wherein, when the location of the matching sequence is not in the LRU table, the location of the matching sequence is encoded with Huffman encoding using, a second Huffman table, different from the first Huffman table (Vidal 0041, 0042).

29. At the time the invention was made, given the teachings for compressing data by matching sequence of data to be compressed with a sequence of data in a history

buffer, the teachings of Vidal for using a combination of compression algorithms would have been obvious. One of ordinary skill in the art would be motivated to compress data multiple times with various algorithms in order to achieve a higher compression ratio (Vidal 0042).

30. Regarding claim 13, Whiting-Vidal teaches:

using the second Huffman table to also compress literal sequences that have no matching index in the history buffer (Vidal 0047); and

streaming the compressed literal sequences to the second device (Vidal 0002).

31. Regarding claim 14, Whiting-Vidal teaches when the initial sequence at the current pointer does not match any sequence in the history buffer, the initial byte sequence at the current pointer is encoded (Vidal 0047; Whiting col 2/ln 32) for inclusion into configured data for

streaming by an encoding technique selected from the group consisting of:

Huffman encoding (Vidal 0047; Whiting col 2/ln 32).

32. Regarding claim 15, Whiting-Vidal teaches determining whether the location of the matching sequence matches one of a plurality of locations in the LRU table (look aside buffer) (Whiting col 15/ln 17-25), wherein:

each said location in the LRU table has a corresponding said LRU representation (Whiting col 15/ln 17-25);

each said location in the LRU table describes one of a plurality of last recently used locations of sequences in previously streamed data (Whiting col 15/ln 17-25); and

if the location of the matching sequence is included in the LRU table, the location of the matching sequence is encoded with a corresponding said LRU representation from the LRU table (Whiting col 15/ln 17-25).

33. Regarding claim 16, Whiting-Vidal teaches one or more computer-readable storage media storing computer-executable instructions that, when executed, perform the method as recited in claim 12 (Whiting Fig 1).

34. Regarding claim 33, Whiting-Vidal teaches a system comprising:

a network (Whiting col 1/ln 7-10);

a server including a first processor and a first memory (Whiting col 1/ln 7-10) and further comprising:

a first history buffer having a plurality of bytes (Whiting col 1/ln 7-10);

a lookup table that includes a plurality of entries (Whiting col 10/ln 58-60), each said entry being discoverable utilizing a particular one of a plurality of indices(Whiting col 10/ln 58-60) and references whether a corresponding said index is located in the history buffer, and if so, further references one or more locations of the corresponding said index in the history buffer (Whiting col 10/ln 58-67);

a first Huffman table that includes codes for lengths of matching sequences (Vidal 0041);

a second Huffman table, different from the first Huffman table, that includes codes for locations of matching sequences and literal bytes (Vidal 0041, 0042); and

the compression module being executable to:

find one said index sequence in the lookup table that matches an initial sequence in data for communication to a client from a terminal service (Whiting col 9/ln 59);

determine that the corresponding said entry of the matching index references a plurality of said locations (Whiting col 9/ln 59);

for each said location, compare a sequence at the location having the matching index with a sequence in the data, said sequence including the initial sequence (Whiting col 9/ln 49-65);

derive a matching sequence from the comparison based on at least one of a length and the location of the sequence at each said location (Whiting col 5/ln 61-62);

represent the matching sequence using a representation that includes the length and the location of the matching sequence in the history buffer (Whiting col 5/ln 66-68);

wherein the client is configured to receive the configured data (Whiting col 16/ln 29-50);

wherein, when an encoded representation is present in the configured data, the decompression module is configured decode the representation using the LRU table, the third and fourth Huffman tables and finds the matching sequence in the second said history buffer based on the decoded location and the decoded length indicated by the representation (Whiting col 16/ln 29-50)

35. Whiting does not explicitly teach further compressing the compressed data.

36. However in the same field of invention, Vidal teaches using a combination of compression algorithms including:

compress at least a portion of the representation by encoding the representation, wherein the representation is encoded using a first Huffman (Vidal 0041) table for encoding the length using Huffman encoding and using a last recently used (LRU) table for encoding the location of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences (Whiting col 15/ln 11-24), wherein, when the location of the matching sequence is not in the LRU table, the location of the matching sequence is encoded with Huffman encoding using a second Huffman (Vidal 0041) table different from the first Huffman table (Vidal 0042) (through the idea of trying a combination of algorithms); and

periodically recalculate the first Huffman table and the second Huffman table following processing of a predetermined number of packets of the data (Vidal 0042) (through the idea of trying a combination of algorithms) a client including a second processor and a second memory, the client being

communicatively coupled to the network for communication with the server and including a second said history buffer, a third Huffman table that includes codes for decoding locations of matching sequences and literal bytes, a fourth Huffman table that includes codes for decoding lengths of matching sequences, the LRU table, and a decompression module that is executable by the client to decompress the streamed data [Vidal 0042].

37. At the time the invention was made, given the teachings for compressing data by matching sequence of data to be compressed with a sequence of data in a history buffer, the teachings of Vidal for using a combination of compression algorithms would have been obvious. One of ordinary skill in the art would be motivated to compress data multiple times with various algorithms in order to achieve a higher compression ratio (Vidal 0042).

38. Regarding claim 34, Whiting-Vidal teaches the decompression module is further executable by the client to add decompressed data to the second history buffer (Whiting col 16/ln 29-50).

39. Regarding claim 35, Whiting-Vidal teaches:

using the second Huffman table to also compress literal sequences that have no matching index in the history buffer (Vidal 0047); and

streaming the compressed literal sequences to the second device (Vidal 0002).

40. Regarding claim 36, Whiting-Vidal teaches when the initial sequence at the current pointer does not match any sequence in the history buffer, the initial byte sequence at the current pointer is encoded (Vidal 0047; Whiting col 2/ln 32) for inclusion into configured data for

streaming by an encoding technique selected from the group consisting of:

Huffman encoding (Vidal 0047; Whiting col 2/ln 32).

41. Regarding claim 37, Whiting-Vidal teaches determining whether the location of the matching sequence matches one of a plurality of locations in the LRU table (look aside buffer) (Whiting col 15/ln 17-25), wherein:

each said location in the LRU table has a corresponding said LRU representation (Whiting col 15/ln 17-25);

each said location in the LRU table describes one of a plurality of last recently used locations of sequences in previously streamed data (Whiting col 15/ln 17-25); and

if the location of the matching sequence is included in the LRU table, the location of the matching sequence is encoded with a corresponding said LRU representation from the LRU table (Whiting col 15/ln 17-25).

42. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Whiting in view of Tokunaga et al. (US 5,968,132) (hereinafter Tokunaga).

43. Regarding claim 17, Whiting teaches:

adding data to a history buffer (history array) (Whiting col 10/ln 56-67);

updating a lookup table that references the history buffer to include the added data, (Whiting col 10/ln 56-67);wherein:

the lookup table includes a plurality of entries, each said entry being discoverable utilizing a particular one of a plurality of indices (Whiting col 10/ln 56-67); and

each said entry references whether a corresponding said index is located in a history buffer, and if so, further references one or more locations of the corresponding said index in the history buffer (Whiting col 10/ln 56-67);

starting a current pointer at the added data in the history buffer (Whiting col 6/ln 62-64);

finding one said index in the lookup table that matches an initial sequence at the current pointer (Whiting col 9/ln 42-44; col 10/ln 57-58);

determining that the corresponding said entry of the matching index references a plurality of said locations (Whiting col 9/ln 49-65):

comparing a sequence at each said location having the matching index with a sequence in the added input data that includes the initial sequence(Whiting col 9/ln 49-65);

deriving a matching sequence from the comparison (Whiting col 5/ln 61-68);

representing the matching sequence with a representation that includes the location and a length of the matching sequence in the history buffer (Whiting col 5/ln 61-68);

configuring data to include the representation and advancing the current pointer by the length of the matching sequence (Whiting col 5/ln 28-34; col 6/ln 62-64)

44. However, Whiting does not explicitly teach tuning compression parameters according to a quality of communication.

45. But, in the same field of invention, Tokunaga teaches a method comprising:

receiving feedback that indicates availability of resources for communicating the packetized compressed data over the network from the first device to the second device (Tokunaga col 3/ln 24-34); and

when the current pointer has advanced through the added data, packetizing the configured data for streaming (Whiting col 2/ln 1-11);

tuning one or more parameters (MAXSTR) of the compression process utilized to compress the packetized compressed data in response to the feedback, wherein the tuning comprises increasing a size of a search window used for sequence matchinq in the compression process when the feedback indicates that the compressed data is being transmitted over the network at a lower than expected rate (Whiting col 11/ln 6-7; Tokunaga col 3/ln 24-34).

46. At the time the invention was made, given the teachings of Whiting for compressing data and having a MAXSTR maximum string being searched parameter, the teachings of Tokunaga for controlling a compression parameter according to a quality of communication would have been obvious. One of ordinary skill in the art could obviously apply Tokunaga's teachings to any parameter of a compression algorithm in order to achieve appropriate data transfer (Tokunaga col 3/ln 24-34).

47. Claim 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whiting in view of Tokunaga and in view of Vidal.

48. Regarding claim 18, Whiting-Tokunaga substantially teaches the invention detailed in claim 17.

49. However, Whiting-Tokunaga does not explicitly teach further compressing the compressed data.

50. But, in the same field of invention, Vidal teaches using a combination of compression algorithms including:

further compressing the compressed data by encoding the at least one representation, wherein the at least one representation is encoded using a first Huffman table for encoding the length using Huffman (Vidal 0041) encoding and usinq a last recently used (LRU) table for encoding the location of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences (Whiting col 15/ln 11-24), wherein, when the location of the matching sequence is not in the LRU table (cache miss), the location of the matching sequence is encoded with Huffman encoding using a second Huffman table (Vidal 0042) (through the idea of trying a combination of algorithms); and

streaming the compressed data over the network to the second device (Vidal 0002).

51. At the time the invention was made, given the teachings for compressing data by matching sequence of data to be compressed with a sequence of data in a history buffer, the teachings of Vidal for using a combination of compression algorithms would have been obvious. One of ordinary skill in the art would be motivated to compress data multiple times with various algorithms in order to achieve a higher compression ratio (Vidal 0042).

52. Regarding claim 19, Whiting-Tokunaga-Vidal teaches one or more computer-readable storage media storing computer-executable instructions that, when executed, perform the method as recited in claim 17 (Tokunaga Fig 6).

53. Regarding claim 20, Whiting-Tokunaga-Vidal teaches:

receiving a request at a server from a client for remote access to an application or a file that is available through the server (Tokunaga col 3/ln 24-34);

determining availability of resources for communicating data in response to the request over a network (Tokunaga col 3/ln 24-34); and

tuning one or more parameters of a compression protocol utilized to compress the data based on the determined availability (Whiting col 11/ln 6-7; Tokunaga col 3/ln 24-34);

compressing the data by adding a first portion of the data to a history buffer at the server (Whiting col 5/ln 61-62);

searching subsequent portions of the data by comparing the subsequent portions with the first portion of the data in the history buffer (Whiting col 5/ln 61-62);

representing the matching sequence using a representation that includes the length and the location of the matching sequence in the history buffer (Whiting col 5/ln 66-68); and

compressing the data further by encoding the at least one representation, wherein the at least one representation is encoded using a first Huffman table for encoding the length using Huffman (Vidal 0041) encoding and usinq a last recently used (LRU) table for encoding the location of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences (Whiting col 15/ln 11-24), wherein, when the location of the matching sequence is not in the LRU table (cache miss), the location of the matching sequence is encoded with Huffman encoding using a second Huffman table, different from the first Huffman table (Vidal 0042) (through the idea of trying a combination of algorithms).

54. Regarding claim 21, Whiting-Tokunaga-Vidal teaches increasing a size of a search window used for sequence matchinq in the compression process when the feedback indicates that the compressed data is being transmitted over the network at a lower than expected rate (Whiting col 11/ln 6-7; Tokunaga col 3/ln 24-34)

55. Regarding claim 22, Whiting-Tokunaga-Vidal teaches one or more computer-readable storage media storing computer-executable instructions that, when executed, perform the method as recited in claim 20 (Tokunaga Fig 6).

56. Claim 23-32 and 38-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whiting in view of Vidal in view of Suzuki (US 2004/0008896).

57. Regarding claim 23, Whiting teaches a server comprising:

a processor and a memory (Whiting col 1/ln 7-10), the memory including a compression module executed by the server for implementing:

a history buffer having a plurality of bytes (Whiting col 10/ln 58-67);;

a lookup table that includes a plurality of entries (Whiting col 10/ln 58-60), each said entry:

being discoverable utilizing a particular one of a plurality of indices(Whiting col 10/ln 58-60); and

references whether a corresponding said index is located in the history buffer, and if so, further references one or more locations of the corresponding said index in the history buffer (Whiting col 10/ln 58-67); and

the compression module being executable to:

find one said index sequence in the lookup table that matches an initial sequence in data for communication to a client from a terminal service (Whiting col 9/ln 59);

determine that the corresponding said entry of the matching index references a plurality of said locations (Whiting col 9/ln 59);

for each said location, compare a sequence at the location having the matching index with a sequence in the data, said sequence including the initial sequence (Whiting col 9/ln 49-65);

derive a matching sequence from the comparison based on at least one of a length and the location of the sequence at each said location (Whiting col 5/ln 61-62);

represent the matching sequence using a representation that includes the length and the location of the matching sequence in the history buffer (Whiting col 5/ln 66-68);

compress at least a portion of the representation by encoding the representation, wherein the representation is encoded using a first Huffman (Vidal 0041) table for encoding the length using Huffman encoding and using a last recently used (LRU) table for encoding the location of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences (Whiting col 15/ln 11-24), wherein, when the location of the matching sequence is not in the LRU table, the location of the matching sequence is encoded with Huffman encoding using a second Huffman (Vidal 0041) table, different from the first Huffman table (Vidal 0042) (through the idea of trying a combination of algorithms).

However, Whiting-Vidal does not explicitly teach periodically recalculating the Huffman tables. But, in the same field of invention, Suzuki teaches periodically recalculate the

first Huffman table and the second Huffman table following processing of a predetermined number of packets of the data (Suzuki 0038).

It would be obvious for one of ordinary skill in the art to combine the teachings of recalculating the Huffman tables, in order to prevent a compression ratio from deteriorating (Suzuki 0037, 0038).

58. Regarding claim 24, Whiting-Vidal-Suzuki teaches:

the forming compressed data includes finding one said index in the lookup table for each said sequence in the data (Whiting col 10/ln 58-67).

59. Regarding claim 25, Whiting-Vidal-Suzuki teaches the corresponding said entry of the matching index references a hash chain (hash link table) which includes each said location of the matching index in the history buffer (Whiting col 10/ln 58-67).

60. Regarding claim 26, Whiting-Vidal-Suzuki teaches the initial sequence and the index are each composed of at least two bytes (Whiting col 9/ln 58-61).

61. Regarding claim 27, Whiting-Vidal-Suzuki teaches:

streaming the compressed data over a network, wherein the data is formatted as one or more packets and the packets are compressed for transmission over the network so that the compressing is performed on a per-packet basis (Vidal 0047).

62. Regarding claim 28, Whiting-Vidal-Suzuki teaches:

using the second Huffman table to also compress literal sequences that have no matching index in the history buffer (Vidal 0047); and

streaming the compressed literal sequences to the second device (Vidal 0002).

63. Regarding claim 29, Whiting-Vidal-Suzuki teaches when the initial sequence at the current pointer does not match any sequence in the history buffer, the initial byte

sequence at the current pointer is encoded (Vidal 0047; Whiting col 2/ln 32) for inclusion into configured data for
streaming by an encoding technique selected from the group consisting of:

Huffman encoding (Vidal 0047; Whiting col 2/ln 32).

64. Regarding claim 30, Whiting-Vidal-Suzuki teaches the comparison to derive the matching sequence is performed utilizing one or more thresholds selected from the group consisting of:

a number of said locations having the matching index to be compared (MAXHCNT) (Whiting col 14/ln 19-21);

a size of a value that describes each said location having the matching index (MEMSIZE) (Whiting col 10/ln 21-24); and

a size of a value that describes a length of the sequence at each said location that matches the sequence in the data that includes the matching index (MAXSTR) (Whiting col 11/ln 6-7).

65. Regarding claim 31, Whiting-Vidal-Suzuki teaches employing a cost function (compare size) to determine if the representation utilizes less memory when stored than the matching sequence, and if so, forming compressed data that includes the representation (Whiting col 5/ln 28-34).

66. Regarding claim 32, Whiting-Vidal-Suzuki teaches determining whether the location of the matching sequence matches one of a plurality of locations in the LRU table (look aside buffer) (Whiting col 15/ln 17-25), wherein:

each said location in the LRU table has a corresponding said LRU representation (Whiting col 15/ln 17-25);

each said location in the LRU table describes one of a plurality of last recently used locations of sequences in previously streamed data (Whiting col 15/ln 17-25); and

if the location of the matching sequence is included in the LRU table, the location of the matching sequence is encoded with a corresponding said LRU representation from the LRU table (Whiting col 15/ln 17-25).

67. Regarding claim 38, Whiting teaches a computer-readable storage medium storing computer-executable instructions that, when executed by a computer, direct the computer to:

find an index in a lookup table that matches an initial sequence in data for streaming to a client, the data for generating a user interface of an application that is being executed remotely from the client (Whiting col 10/ln 58-60), wherein:

the lookup table includes a plurality of entries, each said entry being discoverable utilizing a particular one of a plurality of said indices (Whiting col 10/ln 58-60); and

each said entry references whether a corresponding said index is located in a history buffer; and if so, further references one or more locations of the corresponding said index in the history buffer (Whiting col 10/ln 58-67);

determine that the corresponding said entry of the matching index references a plurality of said locations (Whiting col 9/ln 59);

for each said location, compare a sequence at the location having the matching index with a sequence in the data, said sequence including the initial sequence (Whiting col 9/ln 49-65)

compute, from the comparison, a length of the matching sequence (Whiting col 5/ln 61-62);

represent the matching sequence using a representation that includes the length and the location (Whiting col 5/ln 66-68);

68. However, Whiting does not explicitly teach further compressing the compressed data.

69. But, in the same field of invention, Vidal teaches using a combination of compression algorithms including:

compress the representation by encoding the representation, wherein the representation is encoded using a first Huffman table for encoding the length using Huffman encoding and using a last recently used (LRU) table for encoding the location of the matching sequence in the history buffer, wherein the LRU table lists a plurality of recently used locations of recent matching sequences, wherein, when the location of the matching sequence is not in the LRU table, the location of the matching sequence is encoded with Huffman encoding using a second Huffman table, different from the first Huffman table (Vidal 0041, 0042).

70. At the time the invention was made, given the teachings for compressing data by matching sequence of data to be compressed with a sequence of data in a history buffer, the teachings of Vidal for using a combination of compression algorithms would have been obvious. One of ordinary skill in the art would be motivated to compress data multiple times with various algorithms in order to achieve a higher compression ratio (Vidal 0042).

71. However, Whiting-Vidal does not explicitly teach periodically recalculating the Huffman tables.

72. But, in the same field of invention, periodically recompute the first Huffman table and the second Huffman table following processinq of a predetermined number of packets of the data (Suzuki 0038).

73. It would be obvious for one of ordinary skill in the art to combine the teachings of recomputing the Huffman tables, in order to prevent a compression ratio from deteriorating (Suzuki 0037, 0038).

74. Regarding claim 39, Whiting-Vidal-Suzuki teaches the computer-executable instructions direct the computer to use the second Huffman table to also compress literal sequences that do not match any sequence in the history buffer (Vidal 0041, 0042).

75. Regarding claim 40, Whiting-Vidal-Suzuki teaches the corresponding said entry of the matching index references a hash chain (hash link table) which includes each said location of the matching index in the history buffer (Whiting col 10/ln 58-67).

76. Regarding claim 41, Whiting-Vidal-Suzuki teaches the initial sequence and the index are each composed of at least two bytes (Whiting col 9/ln 58-61).

77. Regarding claim 42, Whiting-Vidal-Suzuki teaches:

using the second Huffman table to also compress literal sequences that have no matching index in the history buffer (Vidal 0047); and

streaming the compressed literal sequences to the second device (Vidal 0002).

78. Regarding claim 43, Whiting-Vidal-Suzuki teaches when the initial sequence at the current pointer does not match any sequence in the history buffer, the initial byte sequence at the current pointer is encoded (Vidal 0047; Whiting col 2/ln 32) for inclusion into configured data for
streaming by an encoding technique selected from the group consisting of:

Huffman encoding (Vidal 0047; Whiting col 2/ln 32).

79. Regarding claim 44, Whiting-Vidal-Suzuki teaches the comparison to derive the matching sequence is performed utilizing one or more thresholds selected from the group consisting of:

a number of said locations having the matching index to be compared (MAXHCNT) (Whiting col 14/ln 19-21);

a size of a value that describes each said location having the matching index (MEMSIZE) (Whiting col 10/ln 21-24); and

a size of a value that describes a length of the sequence at each said location that matches the sequence in the data that includes the matching index (MAXSTR) (Whiting col 11/ln 6-7).

80. Regarding claim 45, Whiting-Vidal-Suzuki teaches employing a cost function (compare size) to determine if the representation utilizes less memory when stored than the matching sequence, and if so, forming compressed data that includes the representation (Whiting col 5/ln 28-34).

81. Regarding claim 46, Whiting-Vidal-Suzuki teaches determining whether the location of the matching sequence matches one of a plurality of locations in the LRU table (look aside buffer) (Whiting col 15/ln 17-25), wherein:

each said location in the LRU table has a corresponding said LRU representation (Whiting col 15/ln 17-25);

each said location in the LRU table describes one of a plurality of last recently used locations of sequences in previously streamed data (Whiting col 15/ln 17-25); and if the location of the matching sequence is included in the LRU table, the location of the matching sequence is encoded with a corresponding said LRU representation from the LRU table (Whiting col 15/ln 17-25).

Conclusion

82. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CARLOS R. PEREZ TORO whose telephone number is (571) 270-5649. The examiner can normally be reached on Monday-Friday 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Vaughn can be reached on 571-272-3922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/C. R. P./
Examiner, Art Unit 2444

/Yemane Mesfin/
Primary Examiner, Art Unit 2444